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**What is claimed is:**

1. A combination responsive to an acoustic wave, comprising:
   a. a substrate having a first surface and an opposite second surface;
   b. a microphone positioned on the first surface of the substrate and having an input and a first output and a second output, wherein the input receives a biased voltage, and the microphone generates an output signal responsive to the acoustic wave between the first output and the second output; and
   c. an amplifier positioned on the first surface of the substrate and having a first input and a second input and an output;

   wherein the first input of the amplifier is electrically coupled to the first output of the microphone and the second input of the amplifier is electrically coupled to the second output of the microphone for receiving the output signal from the microphone; and

   wherein the amplifier is spaced from the microphone with a separation smaller than 0.5 mm.

2. The combination of Claim 1, wherein the substrate comprises a semiconductor material.

3. The combination of Claim 2, wherein the semiconductor material is silicon.

4. The combination of Claim 1, wherein the microphone comprises a piezoresistive microphone.

5. The combination of Claim 4, wherein the piezoresistive microphone comprises:
   a. a semiconductor substrate having a cavity;

b. a diaphragm covering the cavity; and

c. at least one piezoresistor positioned on top of the diaphragm, wherein when the cavity receives the acoustic wave, the diaphragm moves in response to cause stress in the piezoresistor, and the piezoresistor generates an electric signal responsive to the acoustic wave.

6. The combination of Claim 5, further comprising a channel in fluid communication with the cavity and the ambient atmosphere, wherein the channel is positioned on the surface of the semiconductor substrate and terminated at one end with a vent hole in fluid communication with the ambient atmosphere.

7. The combination of Claim 5, wherein the piezoresistor is electrically coupled to the first and second outputs of the microphone to cause an electrical voltage as output signal from the electric signal responsive to the acoustic wave.

8. The combination of Claim 5, further comprising at least one resistor electrically coupled to the piezoresistor.

9. The combination of Claim 5, wherein the diaphragm comprises a silicon-nitride membrane.

10. The combination of Claim 5, wherein the piezoresistor comprises a single-crystal silicon piezoresistor.

11. The combination of Claim 10, wherein the piezoresistor is silicon-dioxide encapsulated.

12. The combination of Claim 5, wherein the microphone comprises four piezoresistors forming a Wheatstone bridge.

13. A method of assembling a combination responsive to an acoustic wave, comprising:
    a. providing a substrate having a first surface and an opposite second surface;
    b. positioning a microphone on the first surface of the substrate, wherein the microphone has an input and a first output and a second output; and
    c. positioning an amplifier on the first surface of the substrate spaced from the microphone with a separation smaller than 0.5 mm, wherein the amplifier has a first input electrically coupled to the first output of the microphone and a second input electrically coupled to the second output of the microphone and an output.

14. The method of Claim 13, wherein the substrate comprises a silicon layer.

15. The method of Claim 13, wherein the microphone is a piezoresistive microphone.

16. A combination responsive to an acoustic wave, comprising:
    a. a microphone having an input and a first output and a second output, wherein the input receives a biased voltage, and the microphone generates an output signal responsive to the acoustic wave between the first output and the second output;
    b. an amplifier having a first input and a second input and an output, wherein the first input of the amplifier is electrically coupled to the first output of the microphone and the second input of the amplifier is electrically coupled to the second output of the microphone for receiving the output signal from the microphone;
    c. a first high pass filter electrically coupled between the first input of the amplifier and the first output of the microphone; and

d. a second high pass filter electrically coupled between the second input of the amplifier and the second output of the microphone,

wherein the output signal from the microphone has a DC component and an AC component, and the first and second high pass filters substantially block the DC component and allow the AC component of the output signal from the microphone to pass, thereby to allow the amplifier to generate a low impedance signal at the output.

17. The combination of Claim 16, wherein the microphone comprises four piezoresistors forming a Wheatstone bridge that has a first arm, an opposing second arm, a third arm, and an opposing fourth arm, the first arm being electrically coupled to the input of the microphone, the opposing second arm being electrically coupled to ground, the third arm being eleetrically coupled to the first input of the amplifier, and the opposing fourth arm being electrically coupled to the second input of the amplifier.

18. The combination of Claim 17, wherein the first high pass filter comprises a resistor and a capacitor, the capacitor being electrically coupled in series between the third arm of the Wheatstone bridge and the first input of the amplifier, and the resistor being electrically coupled in parallel between the second arm of the Wheatstone bridge and the capacitor.

19. The combination of Claim 18, wherein the second high pass filter comprises a resistor and a capacitor, the capacitor being electrically coupled in series between the fourth arm of the Wheatstone bridge and the second input of the amplifier, and the resistor being electrically coupled in parallel between the second arm of the Wheatstone bridge and the capacitor.

20. The combination of Claim 19, wherein the resistor of the first high pass filter and the resistor of the second high pass filter are jointly coupled to the second arm of the Wheatstone bridge.

21. The combination of Claim 20, wherein the resistor of the first high pass filter and the resistor of the second high pass filter are substantially identical to each other.

22. The combination of Claim 21, wherein the capacitor of the first high pass filter and the capacitor of the second high pass filter are substantially identical to each other.

23. The combination of Claim 20, wherein each of the resistor of the first high pass filter and the resistor of the second high pass filter is a low profile surface mount resistor.

24. The combination of Claim 23, wherein each of the capacitor of the first high pass filter and the capacitor of the second high pass filter is a low profile surface mount capacitor.

25. The combination of Claim 16, wherein the amplifier is a preamplifier.

26. A combination responsive to an acoustic wave, comprising:
    a. a semiconductor substrate having a first surface and a second surface;
    b. a microphone positioned on the first surface of the semiconductor substrate and having an input and a first output and a second output, wherein the input receives a biased voltage, and the microphone generates an output signal responsive to the acoustic wave between the first output and the second output;

c. an amplifier positioned on the first surface of the semiconductor substrate and having a first input and a second input and an output, wherein the first input of the amplifier is electrically coupled to the first output of the microphone and the second input of the amplifier is electrically coupled to the second output of the microphone for receiving the output signal from the microphone;

d. a first capacitor and a first resistor forming a first RC pair positioned on the first surface of the semiconductor substrate and being electrically coupled between the first input of the amplifier and the first output of the microphone; and

e. a second capacitor and a second resistor forming a second RC pair positioned on the first surface of the semiconductor substrate and being electrically coupled between the second input of the amplifier and the second output of the microphone,

wherein the output signal from the microphone has a DC component and an AC component, and the first and second RC pairs substantially block the DC component and allow the AC component of the output signal from the microphone to pass, thereby to allow the amplifier to generate a low impedance signal at the output, and wherein the amplifier is spaced from the microphone with a separation smaller than 0.5 mm.

27. The combination of Claim 26, wherein the microphone comprises four piezoresistors forming a Wheatstone bridge that has a first arm, an opposing second arm, a third arm, and an opposing fourth arm, the first arm being electrically coupled to the input of the microphone, the opposing second arm being electrically coupled to ground, the third arm being electrically coupled to the first input of the amplifier, and the opposing fourth arm being electrically coupled to the second input of the amplifier.

28. The combination of Claim 27, wherein the first capacitor is electrically coupled in series between the third arm of the Wheatstone bridge and the first input of the amplifier, and the first resistor is electrically coupled in parallel between the second arm of the Wheatstone bridge and the capacitor.

29. The combination of Claim 28, wherein the second capacitor is electrically coupled in series between the fourth arm of the Wheatstone bridge and the second input of the amplifier, and the second resistor is electrically coupled in parallel between the second arm of the Wheatstone bridge and the capacitor.

30. The combination of Claim 29, wherein the first resistor and the second resistor are jointly coupled to the second arm of the Wheatstone bridge.

31. The combination of Claim 30, wherein each of the first resistor and the second resistor is a low profile surface mount resistor.

32. The combination of Claim 30, wherein each of the first capacitor and the second capacitor is a low profile surface mount capacitor.

33. The combination of Claim 26, wherein the semiconductor substrate comprises a silicon layer.

34. The combination of Claim 33, wherein the silicon layer is passivated with silicon dioxide.

35. The combination of Claim 34, further comprises:

a. a plurality of metal bond pads for receiving components positioned on the silicon layer; and

b. a plurality of conductive traces for interconnecting corresponding metal bond pads.

36. The combination of Claim 35, further comprising a package positioned underneath the semiconductor substrate.

37. The combination of Claim 36, wherein the package comprises:
    a. a body for supporting the semiconductor substrate; and
    b. a plurality of pins, each pin being conductive and penetrating through the body.

38. The combination of Claim 37, further comprising a plurality of metal wire bonds, wherein each metal wire bond can make an additional electrical coupling to the metal bond pads and the pins.

39. The combination of Claim 38, wherein each metal wire bond comprises a gold wire bond.

40. The combination of Claim 37, wherein the body is electrically coupled to ground for electromagnetic shielding.

41. The combination of Claim 26, further comprises a package positioned underneath the semiconductor substrate.

42. The combination of Claim 41, wherein the package comprises:
    a. a body for supporting the semiconductor substrate; and
    b. a peripheral portion extending away from the package body.

43. The combination of Claim 42, wherein the body is electrically coupled to ground for electromagnetic shielding.

44. The combination of Claim 42, further comprising a lid positioned above the semiconductor substrate.

45. The combination of Claim 44, wherein the lid comprises:

a. a body; and

b. a peripheral portion extending away from the body,

wherein the lid body is complementarily sized such that when the lid is positioned over the semiconductor substrate, the peripheral portion of the lid matches to and supported by the peripheral portion of the package, and the body covers the semiconductor substrate and components positioned on the semiconductor substrate.

46. The combination of Claim 45, wherein the lid is made from a material that is substantially transparent to the acoustic wave.

47. The combination of Claim 46, wherein the lid is electrically coupled to ground for electromagnetic shielding.

48. A printed circuit board array responsive to an acoustic wave, comprising:

a. a printed circuit board having a first surface and an opposing second surface;

b. a plurality of sockets distributed over the first surface of the printed circuit board;

c. a laser diode positioned on the first surface of the printed circuit board for aiming the printed circuit board array toward to the acoustic wave; and

d. a plurality of microphone packages, wherein each microphone package is complimentarily sized and received in a corresponding socket and contains at least one microphone responsive to the acoustic wave.

49. The printed circuit board array of Claim 48, further comprising at least one SMB – style cable connector positioned on the second surface of the printed circuit board.

50. The printed circuit board array of Claim 48, further comprising at least one support layer positioned above the first surface of the printed circuit board.

51. The printed circuit board array of Claim 48, further comprising at least one support layer positioned below the second surface of the printed circuit board.

52. The printed circuit board array of Claim 51, wherein each of the support layers comprises a garolite stiffening layer.

53. The printed circuit board array of Claim 52, wherein each of the garolite stiffening layer is bonded to the printed circuit board.

54. The printed circuit board array of Claim 48, wherein the printed circuit board comprises a double-sided copper clad.

55. The printed circuit board array of Claim 48, wherein the printed circuit board has a center, and the plurality of microphone packages are distributed over the first surface of the printed circuit board along a plurality of concentric rings, each ring having a radius measured from the center of the printed circuit board different from the radius of any other ring.

56. The printed circuit board array of Claim 55, wherein an equal number of the microphone packages are distributed over each ring.

57. The printed circuit board array of Claim 48, wherein each microphone package has at least one microphone responsive to the acoustic wave and at least one amplifier coupled to and spaced from the microphone with a separation smaller than 0.5 mm.

58. The printed circuit board array of Claim 57, wherein the microphone is a piezoresistive microphone.

59. The printed circuit board array of Claim 57, wherein each microphone package comprises:

a. a semiconductor substrate having a first surface and a second surface;

b. a microphone positioned on the first surface of the semiconductor substrate and having an input and a first output and a second output, wherein the input receives a biased voltage, and the microphone generates an output signal responsive to the acoustic wave between the first output and the second output;

c. an amplifier positioned on the first surface of the semiconductor substrate and having a first input and a second input and an output, wherein the first input of the amplifier is electrically coupled to the first output of the microphone and the second input of the amplifier is electrically coupled to the second output of the microphone for receiving the output signal from the microphone;

d. a first capacitor and a first resistor forming a first RC pair positioned on the first surface of the semiconductor substrate and being electrically coupled between the first input of the amplifier and the first output of the microphone; and

e. a second capacitor and a second resistor forming a second RC pair positioned on the first surface of the semiconductor substrate and being electrically coupled between the second input of the amplifier and the second output of the microphone,

wherein the output signal from the microphone has a DC component and an AC component, and the first and second RC pairs substantially block the DC component and allow the AC component of the output signal from the microphone to pass, thereby to allow the amplifier to generate a low

impedance signal at the output, and wherein the amplifier is spaced from the microphone with a separation smaller than 0.5 mm.

60. The printed circuit board array of Claim 59, wherein the microphone comprises four piezoresistors forming a Wheatstone bridge that has a first arm, an opposing second arm, a third arm, and an opposing fourth arm, the first arm being electrically coupled to the input of the microphone, the opposing second arm being electrically coupled to ground, the third arm being electrically coupled to the first input of the amplifier, and the opposing fourth arm being electrically coupled to the second input of the amplifier.

61. The printed circuit board array of Claim 60, wherein the first capacitor is electrically coupled in series between the third arm of the Wheatstone bridge and the first input of the amplifier, and the first resistor is electrically coupled in parallel between the second arm of the Wheatstone bridge and the capacitor.

62. The printed circuit board array of Claim 61, wherein the second capacitor is electrically coupled in series between the fourth arm of the Wheatstone bridge and the second input of the amplifier, and the second resistor is electrically coupled in parallel between the second arm of the Wheatstone bridge and the capacitor.

63. The printed circuit board array of Claim 62, wherein the first resistor and the second resistor are jointly coupled to the second arm of the Wheatstone bridge.

64. The printed circuit board array of Claim 63, wherein the semiconductor substrate comprises a silicon layer.

65. The printed circuit board array of Claim 64, wherein the microphone package further comprises:

a. a package body positioned underneath the semiconductor substrate for supporting the semiconductor substrate; and

b. a peripheral portion extending away from the package body.

66. The printed circuit board array of Claim 65, wherein the package body is electrically coupled to ground for electromagnetic shielding.

67. The printed circuit board array of Claim 65, wherein the microphone package further comprises a lid positioned above the semiconductor substrate.

68. The printed circuit board array of Claim 67, wherein the lid comprises:

a. a body; and

b. a peripheral portion extending away from the body,

wherein the body is complementarily sized such that when the lid is positioned over the semiconductor substrate, the peripheral portion of the lid matches to and supported by the peripheral portion of the package, and the body covers the semiconductor substrate and components positioned on the semiconductor substrate.

69. The printed circuit board array of Claim 68, wherein the lid is made from a material that is substantially transparent to the acoustic wave.

70. The printed circuit board array of Claim 70, wherein the lid is electrically coupled to ground for electromagnetic shielding.